A NOTE ON THE HESPERIIDAE (LEPIDOPTERA) (SKIPPERS) OF TUGLO WILDLIFE REFUGE, NEW SOUTH WALES

C.N. SMITHERS

Research Associate, Australian Museum, P.O. Box A285, Sydney South, N.S.W., 2000.

Abstract

This paper presents results of observations on the seasonal flight activity of Hesperiidae at a single New South Wales locality, in the Hunter River Valley, over a period of 12 seasons. The species fall into three groups, those which appear early, in the middle and late in the season. The taxonomic affinities and larval host plant preferences for each group are discussed briefly.

Introduction

Although information on seasonal flight activity of butterflies is available in general terms in the literature (e.g. Common and Waterhouse 1972; Fisher 1978) there are few published details for individual localities or areas such as that provided by Kitching *et al.* (1978) for the Australian Capital Territory. Distribution of some species over several climatic and faunistic zones in the eastern part of Australia make it inevitable that flight times vary from one locality to another. Understanding of their biology and ecology would be enhanced if detailed information on flight times were available for a range of localities. This paper provides information based on observations of flight activity of the Hesperiidae (Skippers and related species) at Tuglo Wildlife Refuge (altitude 750 m) between mid 1980 and mid 1992. A brief description of the location of the Refuge, about 49 km north of Singleton, New South Wales, its environment and the method of summarizing flight activity information in seven day periods, gathered over a number of seasons, has been given in an earlier similar paper on the Papilionoidea (Smithers 1981). Prior to the survey period casual observations were made and these records, where significant, are included. Flight periods for each species are given in Figure 1.

Results

Netrocoryne repanda C. and R. Felder (Eastern flat) was not captured until 1987 after which it has often been seen in flight from mid November to late January. In 1988 the species was not seen after late December and it appeared that the flight season had ended early. In early March, 1989, however, a few more specimens were recorded. Knowledge of the life cycle of this species (Common and Waterhouse 1972, p. 100) suggests that the March specimens may not represent a second generation. As it is not a known migrant immigration from another source area is also unlikely and its temporary disappearance remains inexplicable on available data.

Trapezites symmomus Hübner (Symmomus skipper). An occasional specimen was seen prior to 1989, since which it has been fairly common so the records probably represent a true picture of its flight period. Its earliest appearance was at the end of December and its latest record at the end of March.

Trapezites praxedes (Plötz) has been taken only once, in March, 1991. Length of flight period is, therefore, not known for the Tuglo area.

Anisynta tillyardi Waterhouse and Lyell (Tillyards's skipper) is not common and its appearance somewhat erratic with only a few specimens seen in three of the survey years. The flight period appears to be short, of about seven weeks duration from mid January to early March.

Dispar compacta (Butler) (Dispar skipper) has a short flight period, also of about seven weeks, but it appears and disappears a little later than *A. tillyardi*, that is, from about mid February to the end of March. It is a fairly common species and the records probably represent the true flight period.

Pasma tasmanica (Miskin) has been taken twice only, in mid September, 1979 and in late March, 1988 suggesting an early beginning to a long flight period. These specimens may represent an early and a late generation. (Atkins 1988).

Signeta flammeata (Butler) (Bright shield skipper) is regularly in flight from mid December until late March, but has not been common in any year.

Signeta tymbophora (Meyrick and Lower) (Dingy shield skipper) was recorded on two occasions only, at the end of January and the end of March, both in 1991, suggesting a possible late starting, short flight period. The data for this species at Tuglo is minimal and it may belong to a group of species with mid season flight.

Toxidia peron (Latreille) (Large dingy skipper). This is a common species on the Refuge, in flight from mid October until mid April. It was recorded in flight in almost every seven day period other than those of December, from 1987 onwards.

Toxidia parvula (Plötz) (Parvula skipper). Only two specimens of this species have been recorded, both before the start of the survey. The first was collected by J.V. Peters in January, 1972 and the second by me in March, 1978. It has not been seen since. At the latitude of Tuglo and farther south it seems to be mainly a coastal species so its rarity at the Tuglo altitude of 750m is to be expected.

Toxidia doubledayi (Felder) (Doubleday's skipper) is in flight from mid November to the end of March. Like *T. parvula* it seems to have a more coastal distribution at the latitude of Tuglo and farther south. It, too, has been recorded only twice during the survey, in mid December, 1988 and at the beginning of April, 1991. Other, presurvey records, are for mid February, 1978 and mid November, 1978.

Toxidia rietmanni (Semper) (White-brand skipper). Although this species is known from Barrington Tops, to the north-east of the Refuge, only one specimen has been collected, in January, 1976, by J.V. Peters. It is otherwise mainly a coastal species and would certainly not be expected to be common at the Refuge altitude of 750 m.

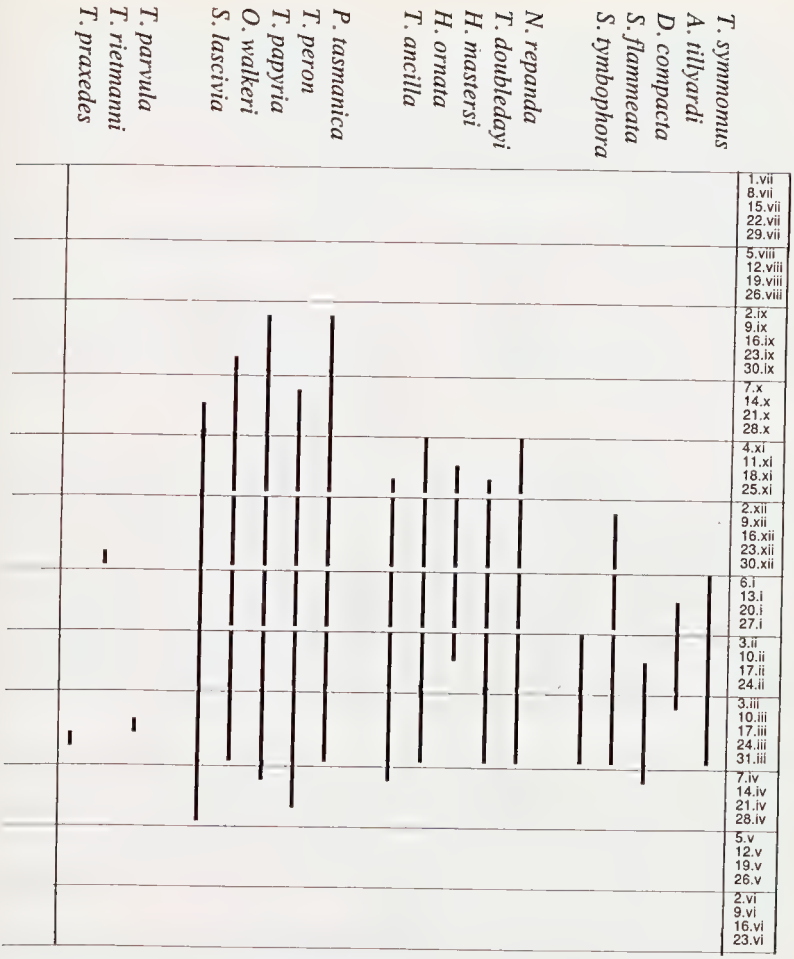

Fig. 1. Flight period for species of Hesperiidae.

Hesperilla mastersi Waterhouse (Master's skipper) is in flight from mid November to mid February. It is never common, its distribution being somewhat similar to that of *T. parvula*.

Hesperilla ornata (Leach) (Spotted skipper) is also an uncommon species having been seen on relatively few occasions, the earliest being mid November and the latest the end of March. This covers the same flight period as *T. doubledayi*.

Taractrocera papyria (Boisduval) (White grassdart) is probably the commonest hesperiid at the Refuge and has the longest flight period, exceeding even *T. peron* by a few weeks. It appears in early September and

ends its flights at the end of March. In the 1989-1990 and 1990-1991 seasons populations were low.

Ocybadistes walkeri Heron (Yellow-banded dart) has a similar flight period to that of *T. papyria* but appears a little later, at the end of September, and disappears at the end of March. It is also a common species, sometimes being very adundant.

Suniana lascivia (Rosenstock) (Dingy dart) is common and appears in flight from mid October until towards the end of April.

Telicota ancilla (Herrich-Schäffer) (Greenish darter) is not common at higher altitudes over its range and is not so at Tuglo. The earliest recorded appearance is in late November and the latest in early April. Few specimens have been seen and all have been recorded after 1988.

Discussion

Eighteen species of Hesperiidae have been recorded at the Refuge. No flight activity occurred between the 28th April and 8th September, that is, there is little likelihood of any hesperiid being in flight during a nineteen week period in the cooler months of the year. The whole flight "season" lasts about 33 weeks. After appearance of the earliest species in early to mid September the number increases to a maximum during February. After a rapid decline in March all flight stops by the end of April (Fig. 2). Most species continue their flight period into March irrespective of the time of first appearance.

Of the eighteen species recorded *T. parvula* has been taken twice on dates close together and *T. praxedes* and *T. rietmanni* only once so that no conclusions can be drawn as to their flight period at the Refuge. They are not discusssed further. They are included in Figure 1 but not in Figure 2 or Table 1.

The remaining species, for which the data appears to be a more reliable indicator of true flight period, can be arranged in three groups according to the time at which they first appear.

a) Five species, *T. peron, S. lascivia, O. walkeri, P. tasmanica* and *T. papyria* appear early in the season and have the longest flight periods, starting in early September (*T. papyria* and *P. tasmanica*)) or early/mid October (the other species in this group) and continuing until the end of March or even into mid April in the case of *T. peron* and *S. lascivia.*

b) *N. repanda, H. mastersi, H. ornata, T. doubledayi* and *T. ancilla* make up a group which appears from about the middle of November and continues until late March or into April.

c) The remaining five species, *T. symmomus, A. tillyardi, S. flammeata, S. tymbophora* and *D. compacta* consistently delay appearance until late in the season, that is until January with the last to appear, *D. compacta*, not being

Table 1. Larval food plants of hesperiid species. (Larval food plant data kindly provided by Andrew Atkins indicated by open squares).

	Poa	*Lomandra*	*Gahnia*	*Carex*	*Imperata*	*Cynodon*	*Tetrarrhena*	*Pennisetum*	*Microlaena*	*Echinopogon*	*Paspalum*	*Danthonia*	*Oryza*	*Sorghum*	*Brachypodium*	"Grasses"	*Dianella*	Dicotyledons
T. symmomus		■																
A. tillyardi	■																	
D. compacta	■	❑														❑		
S. flammeata	■						❑											
S. tymbophora	?			❑														
N. repanda																		■
T. doubledayi																■		
H. mastersi			■															
H. ornata			■	❑														
T. ancilla					■						■			■				
P. tasmanica							■									❑		
T. peron			■	❑												❑		
T. papyria	■			■	■	■		■	■	■	■	■	■		■	■	■	
O. walkeri						■		■										
S. lascivia					■													

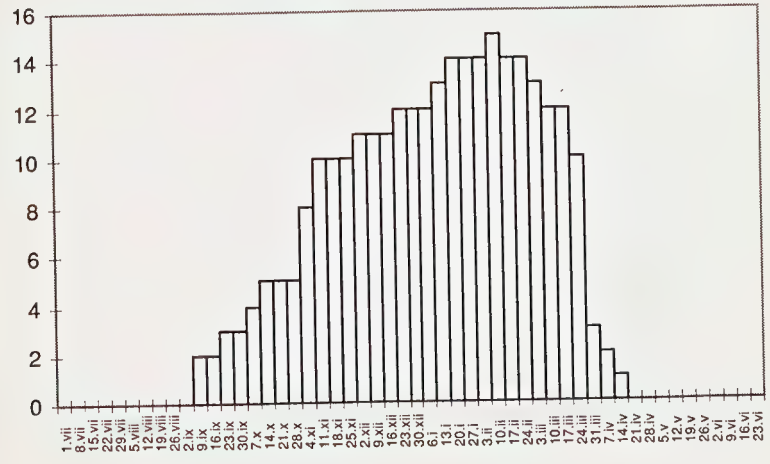

Fig. 2. Number of species in flight.

seen until February. Although there is a single December record for *S. flammeata* all other Tuglo records for it are for January or later, suggesting that its flight activity is probably more in keeping with this group than the mid-season, November species.

It is interesting to consider the flight periods of the groups in the light of their taxonomic relationships and their larval host plant preferences. The early species include members of the Trapezitinae and Hesperiinae. The middle group includes species of Trapezitinae, Hesperiinae and one species of the Pyrginae. The late species, however, constitute a taxonomically more restricted group, all belonging to the Trapezitinae.

The larval host plant preferences of the early- and middle flight-time species (Table 1) include a wide range of monocotyledonous plants such as species of Cyperaceae (*Gahnia* spp. and, in the case of one species, dicotyledonous plants) but they do not utilize either *Poa* (Poaceae) (apart from one "perennial" species) nor *Lomandra* (Xanthorrhoeaceae). They do use other genera of Poaceae and an early species (*O. walkeri* (Waterhouse) has been reported using *Dianella* (Liliaceae). Heperiid species usually have a fairly restricted host plant range.

The late-flight group is taxonomically more circumscribed (Trapezitinae only) and has more restricted host plant preferences. They are the species which are confirmed as using mainly *Poa* and *Lomandra*. This is in strong contrast to the other groups. It may appear at first sight that flight time coincidence is related to taxonomic affinity. That this may not be so, however, is suggested by the fact that their relatives in other flight-time groups do use other larval host plants. Flight-time constraints on the late species may, in fact, to be imposed ecologically through host plant preferences rather than by taxonomic affinity. *Lomandra* and *Poa* tend to flush earlier than host plants of the early-flight species and the late appearance of the species using these hosts may be better explained in terms of development of their host plants. There are references in the literature to host plants as "grasses". Unfortunately, without more information they cannot be used to add much to the present discussion. They are included for general information only in Table 1. In general, adults of the late-flight groups lay their eggs in late summer or autumn. The larvae hatch and commence feeding but development is slow, with reduced feeding activity through winter. Growth becomes more rapid in summer with emergence of the adults being delayed until January or February (Common and Waterhouse 1972). It is interesting to note that these species are synchronizing their developmental cycle with plants which renew their growth early whereas the other species synchronize with later shooting species. Thus, although the appearance of the adults is late in what we usually regard as the butterfly "season" they are, in fact, "early" in their development, this being in anticipation of availability of plants very early in the following season. They appear to use a strategy of late emergence and

slow development during winter to achieve synchrony with early host plant availability, where other species are using a different developmental regime to achieve synchrony with later shooting hosts. There is, as would be expected, a general relationship between growth period of host plants and flight period in hesperiids. The suspected nature of this correlation proposed here can only be confirmed or refuted by detailed study of flight times and larval hosts at many localities over a wide area.

Detailed information on seasonal requirements and development is important where there is need for environmental management. It is hoped that these notes will encourage others to investigate in detail the relationships between seasonal host availability, developmental rates and adult flight periods in butterflies so that the basic data for management will be readily available in future if needed for manipulation of the environment.

Acknowledgements

I would like to thank Andrew Atkins for helpful comments on a draft and data on host plants, John Peters for discussion of this paper in draft and for allowing me to include his collection data, Dr S. Jacobs for kindly providing the all-important information on growth periods of host plants and my wife, Smila, and sons, Graeme and Hartley, for assistance in the field.

References

ATKINS, A.F. 1988. The life histories of *Pasma tasmanica* (Miskin) and *Toxidia rietmanni* (Semper) (Hesperiidae: Trapezitinae). *Australian Entomological Magazine* **14:** 93-97.

COMMON, I.F.B. AND WATERHOUSE, D.F. 1972. *Butterflies of Australia.* Pp. i-xii, 1-498, 41 pls. Angus and Robertson, Sydney.

FISHER, R.H. 1978. Butterflies of South Australia (Lepidoptera: Hesperioidea, Papilionoidea). *Handbook of the Flora and Fauna of South Australia.* 272 pp., 16 pls. South Australian Government.

KITCHING, R.L., EDWARDS, E.D., FERGUSON, D., FLETCHER, M.B. AND WALKER, L.M. 1978. The butterflies of the Australian Capital Territory. *Journal of the Australian Entomological Society* **17:** 125-133

SMITHERS, C.N. 1981. Preliminary note on the Papilionoidea (Lepidoptera) of Tuglo Wildlife Refuge, New South Wales. *Australian Entomological Magazine* **7:** 91-96.